

of the hygiene of potable waters. Those who are acquainted with his former writings will not be surprised at his warning that springs of apparently pure water are in many cases merely the outflow of surface-waters which have disappeared through fissures, carrying with them pollution from the soil and not undergoing purification during their passage through the rocks. Even chalk, according to the writer, is generally far from being a thoroughly effectual filter.

In glancing through M. Martel's work the reader will find, probably to his surprise, that the spelæologist is unquestionably a being of large discourse, looking before and after. In one part he discusses the origin of man and the cradle of his civilisation; in another he speculates on the probable future of humanity; in an early chapter he discourses on the hypotheses concerning the beginning of the earth; in the last chapter he carries the reader forward to the catastrophes likely to bring the history of our planet to a close. Notwithstanding the fact that the range of subjects is thus so wide and diverse, the book remains readable and informing throughout. M. Martel is always vivacious, sometimes impressive, and occasionally original—but never obscure. In fine, he has written a little book which may be described in the best sense of the word as popular.

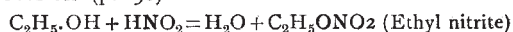
#### CHEMISTRY OF PHARMACOLOGY.

*The Chemical Basis of Pharmacology.* By Francis Francis and J. M. Fortescue-Brickdale. Pp. xii+372. (London: E. Arnold, 1908.) Price 14s. net.

THE general scope of this work is indicated by the above title and the subtitle, reading "An Introduction to Pharmacodynamics based on the Study of the Carbon Compounds." Short general introductions to chemistry and physiology are first given, dealing with such subjects as valency, structural formulæ, isomerism, correlation of chemical and physiological properties, and the relationships between structure and action. Then follow chapters on the main groups of carbon compounds, for example, hydrocarbons, alcohols, purine bodies, and the alkaloids, their methods of preparation and properties, both chemical and physiological. The book contains a fund of information, from which many suggestions as to lines of research may be gathered, and is a genuine attempt to systematise our present knowledge of the chemistry of pharmacology. As such it should prove of great use, more particularly to physiological and pharmaceutical chemists rather than "to the practitioner who is daily brought in contact with the claims of new drugs," and whose chemical knowledge could hardly be expected to reach the standard required for the assimilation of the information given, however desirable such a state of things might be.

We agree with the authors that the student of organic chemistry will find in the work an introduction to a fascinating branch of applied chemistry, but think that the usefulness of the book, alike to the student of chemistry and manufacturer of synthetic drugs, would have been largely increased had more references to original papers been given. It is also

to be regretted that more care has not been bestowed on the book during its passage through the press. The orthography is sometimes unusual in such words as "etherial," "radical," "Kekule," and the work contains innumerable press errors, and many which cannot be attributed to this cause. For example, the expression (p. 90)



is not an equation, nor is the formula for ethyl nitrite correct. Butyl chloral (pp. 79, 109) has not the formula  $\text{CCl}_3\cdot\text{CH}_2\cdot\text{CHO}$ , and trichloroethyl alcohol is not accurately represented as  $\text{CCl}_3\cdot\text{COH}$ . Such faults are inexcusable.

A very deplorable aspect of modern chemistry in its application to pharmacy or physiology would appear to be the lack of system in nomenclature, and a consequent flood of synonyms. This point does not seem to have appealed to the authors, for we find them either ignorant of, or not in agreement with, the systems of nomenclature adopted by the Physiological and Chemical Societies, and in consequence confusion is rendered worse confounded by the adoption of any and every style of naming. We quote as examples "proteid or protein"; "methyl or methylic alcohol"; "sodic or sodium acetate"; "silver hydrate, aqueous potash, ammonium hydroxide"; "glycerol or glycerin"; "mannite or mannitol"; "oxybenzoic or hydroxybenzoic acid"; and "1-oxy-2-iodo-4-chloroquinoline."

It could reasonably have been expected that the authors would have made a serious attempt to introduce order and method where chaos prevails by adhering strictly to those generally accepted principles of nomenclature which, though imperfect, materially help to build up an intelligible chemical literature.

A. C.

#### TWO RECENT BOOKS ON EVOLUTION.

(1) *A Picture Book of Evolution.* By Dennis Hird. Part ii. Pp. vi+214. (London: Watts and Co., 1907.) Price 2s. 6d. net.

(2) *Darwinism To-day.* By Prof. V. L. Kellogg. Pp. xiv+403. (London: George Bell and Sons; New York: Henry Holt and Co., 1907.) Price 7s. 6d. net.

WE cannot recommend anyone wishing to make himself acquainted with the present aspect of the problem of evolution to put himself under Mr. Hird's guidance. His treatment of the subject is crude and uncritical, nor does he give any evidence of familiarity with the evolutionary questions that are now chiefly engaging the attention of biologists. Putting minor inaccuracies aside, the book might have been of some service if published, say, forty years ago; at the present time it is to a large extent either misleading or superfluous. Opposition to the doctrine of species-formation by natural selection comes to-day, not, as the author seems to think (p. 25), from the "House of Lords or the pulpit," but from scientific men, both in this country and abroad; more particularly in Germany and America. While no educated person now disputes the fact of evolution, the Dar-

winian theory is being attacked more vigorously than ever; the assailants, however, belong to a very different class from Darwin's impetuous critics of the early 'sixties. Mr. Hird takes little or no notice of present-day problems, but writes as if the whole question of evolution still occupied the same position as in the mid-Victorian era. Within these limits he is fairly interesting; it is, however, unfortunate that he has admitted to his pages several inaccuracies that might with a little more care have been avoided. "Oasperm," "octoderm," are ugly misprints; "hermaphrodite" does not mean the same as "dioecious"; it is new to us that hæmatococcus "like the amoeba, requires to be magnified some 900 times in order to be seen." Huxley can scarcely be ranked as a "discoverer of evolution"; he would certainly never have made such a claim for himself. The illustrations in Mr. Hird's volume have mostly been seen before. Many of them are good, but the connection of some with the text is remote.

(2) Prof. Kellogg's book is of a very different stamp. So far from ignoring the questions that have in recent years grown up around the central doctrine of evolution, he has devoted an immense amount of labour to collecting, arranging, and expounding the views of nearly all the recent writers on evolutionary subjects. His treatise thus contains a vast quantity of material, in large part consisting of copious quotations from English, French, and German authors, put together somewhat promiscuously, and discussed without much exercise of the critical faculty, but useful to the student as a storehouse of various and conflicting opinions. The author's own standpoint is not very easily discovered. He passes in review the tenets of Darwinians, Lamarckians, Mutationists, Nägelians, with much appearance of giving a fair hearing to all sides. But as he seldom seems to know his own mind for long together, the general result is unsatisfying, not to say irritating; his impartiality is the impartiality of the pendulum rather than that of the judge. The author rightly appreciates the constructive weakness of anti-Darwinian arguments, but greatly overestimates their destructive efficiency. He allows, for example, far too much weight to frivolous objections such as those raised by Wolff in his "Beiträge zur Kritik der darwin'schen Lehre."

In examining the assaults delivered from various quarters on the Darwinian position, one cannot help being struck with the fact that the efforts of objectors tend much more effectively, on the whole, to refute each other than to weaken the defence. It is also quite obvious that to many of these critics Darwin's own writings are practically a sealed book. One cannot suspect Prof. Kellogg of talking about Darwin without having read him; nevertheless he shows, like other writers, a strange confusion of mind with respect to the Darwinian view of the function of natural selection in evolutionary process. Why should it be considered a "weakness" of the Darwinian theory of natural selection that this principle has "no influence whatever on the origin and control of variations"? Darwinism never professed to be an "all-sufficient explanation of adaptation and species-form-

ing" apart from the existence of variation, which fact it takes for granted. It is irrational to blame a theory because it does not explain one of the fundamental data from which it starts.

In at least one passage of his book, the author shows a distinct leaning towards the "orthogenesis" advocated by the school of Eimer. Theories, he thinks, of this general type "are directly in line with the spirit of modern biological methods and investigations." On this point, opinions will differ; we should be inclined to maintain the opposite. On a later page he advances what he considers to be "a logical proof for the introduction into phylogeny of adaptive ontogenetic changes," i.e. a proof of Lamarckism, for it is hard to see any distinction between this view and that of the French evolutionist.

"When species-differences and adaptations are identical with differences and modifications readily directly producible in the individual by varying environment, are we not justified," he asks, "on the basis of logical deduction, to assume the transmutation of ontogenetic acquirements into phyletic acquirements, even though we are as yet ignorant of the physicochemical or vital mechanism capable of effecting the carrying over?"

This question we should unhesitatingly answer in the negative. When rhetoric of the above description is dignified with the name of "proof," we are not surprised to find that the author's estimate of the true bearing of ascertained facts is feeble. It appears to cause him some astonishment that there still exist, "especially in England," thorough-going Darwinians who remain unmoved by the storm of criticism levelled against the theory of natural selection. That there are such stalwarts is undoubtedly the case, and the situation as maintained by them could not be better expressed than in the words, quoted without approval by Prof. Kellogg, of Sir E. Ray Lankester, at York, in August, 1906:—

"In looking back over twenty-five years it seems to me that we must say that the conclusions of Darwin as to the origin of species by the survival of selected races in the struggle for existence are more firmly established than ever."

F. A. D.

#### OUR BOOK SHELF.

*Graphics, applied to Arithmetic, Mensuration, and Statics.* By G. C. Turner. Pp. ix+388. (London: Macmillan and Co., Ltd., 1908.) Price 6s.

THIS work forms a valuable addition to the text-books on an important branch of mathematics, and, coming from a past student of Prof. Henrici, is especially welcome. Within the limits imposed by the author, the subject of graphics is very fully and ably treated. The first chapter, on graphical arithmetic, gives, at perhaps undue length, the geometrical constructions corresponding to the ordinary arithmetical processes, with the employment of scales and squared paper, and is followed by a very useful chapter on the graphical mensuration of plane figures. Vectors are then introduced, with examples of displacement, velocity, and acceleration vectors, and problems on mass centres—altogether a very interesting section. Experimental work is done in connection with concurrent forces in